

***FlyBy Math™* Alignment**  
**Minnesota Academic Standards**  
**Mathematics**

**Strand I. MATHEMATICAL REASONING**

**Standard:** Apply skills of mathematical representation, communication and reasoning throughout the remaining four content strands.

| <b>Benchmarks</b>  | <b><i>FlyBy Math™</i> Activities</b>   |
|--|--|
| 1. Assess the reasonableness of a solution by comparing the solution to appropriate graphical or numerical estimates or by recognizing the feasibility of solutions in a given context and rejecting extraneous solutions. | --Predict outcomes and explain results of mathematical models and experiments.   |
| 2. Appropriately use examples and counterexamples to make and test conjectures, justify solutions and explain results.   | --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.<br><br>--Predict outcomes and explain results of mathematical models and experiments.  |
| 3. Translate a problem described verbally or by tables, diagrams or graphs, into suitable mathematical language, solve the problem mathematically and interpret the result in the original context.                        | --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.<br><br>--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system. |
| 4. Support mathematical results by explaining why the steps in a solution are valid and why a particular solution method is appropriate.   | --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.  |

**Strand II. NUMBER SENSE, COMPUTATION AND OPERATIONS**

***Sub-Strand A. Number Sense***

**Standard:** Use real numbers, represented in a variety of ways, to quantify information and to solve real-world and mathematical problems.

| <b>Benchmarks</b> | <b><i>FlyBy Math™</i> Activities</b>  |
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|                   | --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. |

## Strand III. PATTERNS, FUNCTIONS AND ALGEBRA

### Sub-Strand A. Patterns and Functions

**Standard:** Represent and analyze real-world and mathematical problems using numeric, graphic and symbolic methods for a variety of functions.

| Benchmarks   | FlyBy Math™ Activities   |
|--|--|
| 1. Know the numeric, graphic and symbolic properties of linear, step, absolute value and quadratic functions. Graphic properties may include rates of change, intercepts, maxima and minima. | --Represent distance, speed, and time relationship for constant speed cases using linear equations and a Cartesian coordinate system.<br><br>--Interpret the slope of a line in the context of a distance-rate-time problem. |
| 3. Analyze the effects of coefficient changes on linear and quadratic functions and their graphs.  | --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.  |
| 4. Apply basic concepts of linear, quadratic and exponential expressions or equations in real-world problems such as loans, investments and the path of a projectile.                        | --Predict the relative motion of two airplanes on given paths.<br><br>--Represent distance, speed, and time relationship for constant speed cases using linear equations and a Cartesian coordinate system.                  |

### Sub-Strand B. Algebra (Algebraic Thinking)

**Standard:** Solve simple equations and inequalities numerically, graphically, and symbolically. Use recursion to model and solve real-world and mathematical problems.

| Benchmarks   | FlyBy Math™ Activities   |
|--|--|
| 5. Use a variety of models such as equations, inequalities, algebraic formulas, written statements, tables and graphs or spreadsheets to represent functions and patterns in real-world and mathematical problems. | --Apply mathematics to predict and analyze aircraft conflicts and validate through experimentation.<br><br>--Represent distance, speed, and time relationship for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.                    |
| 7. Solve linear equations and inequalities in one variable with numeric, graphic and symbolic methods.   | --Represent distance, speed, and time relationship for constant speed cases using linear equations and a Cartesian coordinate system.<br><br>--Interpret the slope of a line in the context of a distance-rate-time problem.   |
| 11. Solve systems of two linear equations and inequalities with two variables using numeric, graphic and symbolic methods.   | --Represent distance, speed, and time relationship for constant speed cases using linear equations and a Cartesian coordinate system.<br><br>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates. |

## **Strand V. SPATIAL SENSE, GEOMETRY AND MEASUREMENT**

### ***Sub-Strand C. Measurement***

**Standard:** *Use the interconnectedness of geometry, algebra and measurement to explore real-world and mathematical problems.*

#### **Benchmarks**

#### ***FlyBy Math™* Activities**

--Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation.

--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.